

**Before the  
FEDERAL COMMUNICATIONS COMMISSION  
Washington, D.C. 20554**

In the Matter of

Fixed Wireless Communications Coalition,  
Inc., Request for Modified Coordination  
Procedures in Bands Shared Between Fixed  
Service and the Fixed Satellite Service

RM-11778

**COMMENTS OF GOOGLE FIBER INC.**

Google Fiber Inc. supports the Petition for Rulemaking (*Petition*) filed by the Fixed Wireless Communications Coalition (FWCC) and urges the Commission to consider more broadly whether rule changes can open additional opportunities for service in the 3.7 GHz to 4.2 GHz spectrum band.<sup>1</sup> The Commission should take advantage of all opportunities to free spectrum for commercial use, and the *Petition* identifies an apparent aberration in frequency coordination that may leave large swaths of otherwise-usable spectrum underutilized.<sup>2</sup> The Commission should consider FWCC's specific proposal for improved coordination, as well as other solutions.

Beyond this, the Commission should seek comment on changes to modernize Part 101 of its Rules and enable use of the 3.7-4.2 GHz band for last-mile broadband connections. The current Part 101 regulations for these frequencies are optimized for high-power, long-haul microwave transmissions that are of diminished importance in the era of fiber-optic communications. Several relatively simple changes—such as

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<sup>1</sup> See Petition for Rulemaking of Fixed Wireless Communications Coalition in RM-11778 (filed Oct. 11, 2016) (*Petition*).

<sup>2</sup> *Id.* at 1.

modifying power limits, specifically authorizing point-to-multipoint connections in the band, and updating antenna requirements—would enable use of the 3.7-4.2 GHz band for short-range, superfast broadband connections, as well. The Commission should consider in a rulemaking these and other readily achievable opportunities to promote wireless broadband deployment.

**I. The Commission Should Pursue All Avenues of Freeing Spectrum for Commercial Use**

Every option for freeing additional commercial spectrum deserves exploration. The Commission is deeply engaged in efforts, such as the broadcast incentive auction, that can supplement allocations for traditional wireless services, and has established itself as a global leader in designating spectrum for 5G and other advanced wireless applications.<sup>3</sup> But there are many important wireless applications that depend on finding suitable spectrum, ranging from Wi-Fi-type unlicensed uses to the Internet of Things, and the Commission's existing proposals will not alone be enough to support these developing technologies and use cases.

One area of particular need is last-mile broadband connectivity. No longer a luxury, home broadband connections are key to essential daily tasks like completing school assignments, finding transportation, accessing health care, and getting a job.<sup>4</sup> Yet despite rising Internet usage in the U.S., there remains a long way to go. In 2015,

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<sup>3</sup> See *In the Matter of Use of Spectrum Bands Above 24 GHz For Mobile Radio Services, et al.*, Report and Order and Further Notice of Proposed Rulemaking, 31 FCC Rcd. 8014 (2016) (*Spectrum Frontiers Rulemaking*).

<sup>4</sup> Pew Research Center, *Home Broadband 2015* (2015), <http://www.pewinternet.org/2015/12/21/home-broadband-2015/>.

about one-third of U.S. households still lacked home broadband service.<sup>5</sup> Where Americans want service, but lack suitable options for getting online, providing such options should be a priority of both the Commission and service providers. Additional entry likewise increases competition, to the benefit of all broadband customers. In the next few years, as new households come online and others receive improved service, broadband adoption, Internet traffic, and connection speeds are all expected to increase substantially.<sup>6</sup>

New broadband solutions will be part of this evolution—and wireless will play a critical role. Companies such as Google Fiber, Facebook,<sup>7</sup> Starry,<sup>8</sup> and Verizon<sup>9</sup> are developing last-mile fixed wireless systems that can extend fiber-optic networks and bring high-speed broadband services to residential customers. Webpass, Inc., a wireless Internet access provider owned by Google Fiber, already has rolled out these services in cities including Boston, Chicago, and San Francisco.<sup>10</sup>

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<sup>5</sup> See *id.*

<sup>6</sup> See, e.g., USTelecom, *U.S. IP Traffic Continues Exponential Growth*, [https://www.ustelecom.org/sites/default/files/images/historical-ip-traffic\\_080415-big.png](https://www.ustelecom.org/sites/default/files/images/historical-ip-traffic_080415-big.png) (last visited Jan. 7, 2017); Cisco, *VNI Complete Forecast Highlights Tool*, [http://www.cisco.com/c/m/en\\_us/solutions/service-provider/vni-forecast-highlights.html](http://www.cisco.com/c/m/en_us/solutions/service-provider/vni-forecast-highlights.html) (last visited Jan. 7, 2017); see also Cisco, *The Zettabyte Era - Trends and Analysis* (2016), available at <http://www.cisco.com/c/en/us/solutions/collateral/service-provider/visual-networking-index-vni/vni-hyperconnectivity-wp.html>.

<sup>7</sup> Cade Metz, *Facebook's Massive New Antennas Can Beam Internet for Miles*, WIRE (2016), <https://www.wired.com/2016/04/facebooks-massive-new-antennas-can-beam-internet-miles>.

<sup>8</sup> See Starry web site, <https://starry.com/internet> (last visited Jan. 7, 2017).

<sup>9</sup> See Verizon FiOS web site, <http://www.verizon.com/home/fios-fastest-internet/> (last visited Jan. 7, 2017).

<sup>10</sup> See Webpass web site, [https://webpass.net/about\\_us](https://webpass.net/about_us) (last visited Jan. 9, 2017); see also Verizon News, *Verizon Begins Offering Fios in First Boston Neighborhoods as Revolutionary Citywide Fiber-Optic Rollout Gets Underway* (2016),

Lack of usable spectrum presents a major obstacle to broadband deployments, however. Reliable fixed wireless broadband demands relatively low frequencies that are resistant to environmental degradation, such as attenuation caused by foliage and buildings. While there are lower-frequency bands nominally available for fixed service operations, they are either fully occupied by auctioned licenses (for example, the Broadband Personal Communications Service band at 1850-1990 MHz and the Broadband Radio Service/Educational Broadband Service band at 2496-2690 MHz), or have insufficient available bandwidth (for example, the Private Operational Fixed Microwave Service band at 952-960 MHz).

Ideally, suitable bands would be cleared and repurposed for emerging uses. In reality, this is a long and unwieldy process in the best of circumstances, and it often is difficult to find spectrum for relocated systems. One need look no further than the effort to clear 600 MHz television broadcast spectrum for mobile broadband, which the Commission recommended in the 2010 National Broadband Plan and is still years from completion.

In addition to clearing and repurposing, therefore, the Commission should pursue solutions that can be implemented in a timeframe that is consistent with the immediate need for more available and robust broadband service. Sharing approaches like the Citizens Broadband Radio Service (CBRS) in the 3.55-3.7 GHz band provide one viable option.<sup>11</sup> Another viable option, highlighted by FWCC's *Petition* and discussed below, is

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<http://www.verizon.com/about/news/verizon-begins-offering-fios-first-boston-neighborhoods-revolutionary-citywide-fiber-optic>.

<sup>11</sup> See 47 C.F.R. Part 96.

enabling more intensive use of existing allocations through modest modification of the Commission's technical rules.

## **II. As Recommended by FWCC, the Commission Should Consider Tailoring of FSS Coordination**

FWCC's *Petition* identifies an apparent problem in the 3.7-4.2 GHz band and other bands under 24 GHz that are shared between the Fixed-Satellite Service (FSS) and terrestrial fixed services. Current rules allow "full-band, full-arc" coordination by FSS operators, meaning that they are permitted to coordinate across entire frequency bands and over the entire geostationary arc visible from their location regardless of whether or not they have immediate plans to utilize all those frequencies and satellite positions. Terrestrial fixed service operators, on the other hand, may coordinate only those frequencies and positions they actually use. The *Petition* observes that full-band, full-arc coordination dates back decades to a time when spectrum was relatively plentiful, and overinclusive coordination was anticipated to have "little or no adverse effect upon terrestrial systems."<sup>12</sup> Today, when spectrum is in short supply, it is a seeming inefficiency that cannot be overlooked.<sup>13</sup>

The *Petition* proposes a different approach that warrants consideration. Under FWCC's proposal, FSS operators would be licensed and protected only in the spectrum, azimuths, and elevation angles they intend to use, with allowances for "growth capacity" and for earth stations intended to be used as part of larger networks with a need to

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<sup>12</sup> *Petition* at 6-7 (quoting *Communications Satellite Corp. et al.*, Memorandum Opinion, Order and Authorization, ¶ 7 (1967)).

<sup>13</sup> We do not suggest that such reservations are improper under the Commission's current rules. Indeed, for its own earth stations, Google Fiber has followed the industry-standard practice of full-band, full-arc coordination.

access multiple satellites.<sup>14</sup> These changes could make the rules for coordination between FSS and terrestrial services more equitable, and enable more efficient shared use of the 3.7-4.2 GHz band, among others.<sup>15</sup>

Rule changes like those suggested by FWCC would reflect established Commission policy for FSS coordination generally, such as Rule 96.17(d) requiring that that all in-band and many adjacent-band FSS sites register their specific, rather than potential, use,<sup>16</sup> as well as current practice for coordination of Canadian FSS sites, for which specific frequencies, bandwidth, pointing azimuth and elevation, and antenna diameter are supplied.<sup>17</sup>

There may be better alternatives to FWCC's particular proposal. Indeed, as the *Petition* discusses, the Commission considered other solutions in 2000.<sup>18</sup> But it is difficult to conceive that continuing to permit full-band, full-arc coordination in the absence of a specific need best serves the public interest. If FWCC's assessment is correct, then large amounts of spectrum are being taken out of service despite their potential value to terrestrial fixed operators. Even if FWCC misunderstands the situation and overinclusive spectrum reservations are not a major problem today, it would still be appropriate to revise the Commission's rules to prevent the inefficiencies FWCC fears.

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<sup>14</sup> *Petition* at 8-9.

<sup>15</sup> *Id.* at 2.

<sup>16</sup> 47 C.F.R. § 96.17(d).

<sup>17</sup> See, e.g., Public Notice, *Request for Coordination of Canadian Earth Stations with USA Terrestrial Fixed Stations*, Report No. SPB-266 (rel. Jan. 4, 2017).

<sup>18</sup> *Id.* at 9-11.

### **III. The Commission Should Consider Additional Measures to Allow Increased Utilization of the 3.7-4.2 GHz Band**

In addition to the frequency coordination problem FWCC addresses, the *Petition* implicates a broader question about utilization of the 3.7-4.2 GHz band. As FWCC notes, the characteristics of spectrum in the 4 GHz range make it well-suited for high-power, long-haul terrestrial links.<sup>19</sup> Those same characteristics also make it useful for shorter-range links at lower power, including fixed wireless broadband connections for residences and businesses. As compared to higher frequency spectrum (such as the bands above 24 GHz that are being considered in the *Spectrum Frontiers Rulemaking*), the 3.7-4.2 GHz frequencies offer broadband operators benefits including a better-developed equipment ecosystem, lower network deployment costs due to better propagation (and thus fewer transceivers), better resistance to weather-related disruptions, and the ability to penetrate physical obstacles like foliage and the walls of buildings. The 3.7-4.2 GHz band is already allocated for terrestrial links under the Part 101 framework, and does not have wide-area geographic licensees that would need to be displaced.

In its rulemaking, therefore, the Commission should inquire broadly about rule changes that could support more intensive terrestrial fixed use of the 3.7-4.2 GHz range. Proposed changes should include the following revisions that would update the Part 101 rules to allow a greater diversity of terrestrial deployments, including

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<sup>19</sup> See *Petition* at 7.

short-range broadband delivery, while still supporting and protecting long-haul

microwave use and protecting incumbent FSS operations. Specifically:

- The Part 101 rules include a maximum EIRP formula that is designed to favor long-haul connections, but limits low-power short-haul links, which are integral to wireless broadband networks.<sup>20</sup> The Commission should modify the power limits to make shorter-range services viable between 3.7 GHz and 4.2 GHz on a non-interfering basis.
- For common carrier fixed microwave services, only point-to-point links are authorized, which makes the registration of broadband networks cumbersome and costly.<sup>21</sup> To reduce the complexity and cost of broadband deployments, the Commission should include point-to-multipoint links in the list of authorized services for the 3.7 GHz-4.2 GHz band.
- The Commission should draw on engineering work recently completed in its CBRN proceeding to update Part 101 technical rules including antenna performance specifications, location accuracy requirements, and OOB limits.<sup>22</sup>
- To make spectrum use more efficient and conform with modern industry trends, the Part 101 rules should explicitly accommodate time division duplex (TDD) channels and channel aggregation in the 3.7-4.2 GHz band.<sup>23</sup>
- Broadband traffic generally peaks during the day and evening, and dies down at night. To recognize such fluctuations, the Commission should remove or clarify current band utilization requirements, which stipulate that the traffic loading payload must be maintained at above 50%.<sup>24</sup>
- To give providers greater flexibility in how they roll out their services, the Commission should relax 47 C.F.R. § 101.131(a), which restricts third-party access to network equipment.
- To accommodate a larger number of users in the band, the Commission should consider ways of streamlining dated license assignment and coordination processes.<sup>25</sup> For instance, automated systems employing standardized interference criteria and propagation models could support rapid notification,

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<sup>20</sup> See 47 C.F.R. § 101.143(b).

<sup>21</sup> See 47 C.F.R. § 101.101.

<sup>22</sup> See 47 C.F.R. §§ 101.103(d)(2)(ii), 101.111, 101.115; see *generally* 47 C.F.R. Part 96.

<sup>23</sup> See 47 C.F.R. § 101.147(h).

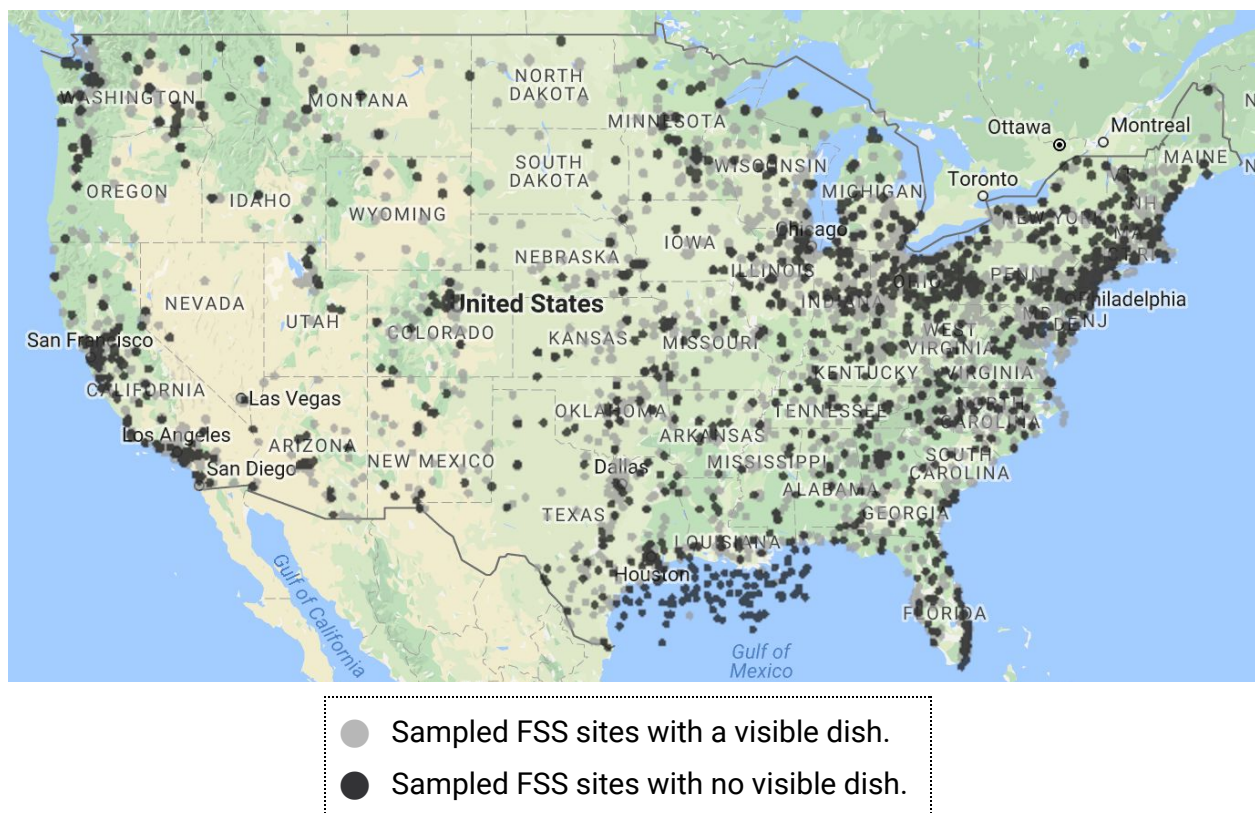
<sup>24</sup> See 47 C.F.R. § 101.141(a)(3)(ii).

<sup>25</sup> See 47 C.F.R. § 101.103(d), which was last codified in 1996 and dates back years before that, and envisions notification being accomplished, for example, by certified mail with a 30-day allowance for a response.



coordination, and authorization. Fixed systems and FSS earth stations are particularly amenable to automated coordination, since their locations and other system characteristics are accurately known and, unlike mobile and portable devices, do not often change.

This list is not necessarily exhaustive. Other ideas for more efficient utilization of the 3.7-4.2 GHz band surely will emerge during the rulemaking process. For example, Google Fiber's review of satellite imagery indicates that the location coordinates for many FSS licenses in the Commission's IBFS database do not correspond to a visible satellite dish. Specifically, the dots on the map below plot a large, random sample of FCC-registered FSS sites. A gray dot indicates that a visible dish was detected in Google Earth imagery at that licensed location, while a black dot indicates that no dish can be seen at or near the specified coordinates, despite the existence of an FCC license.



Unused FSS site licenses could be a source of significant spectrum inefficiency. One solution would be to require satellite operators to update their licenses in a Commission-supervised cleanup similar to the one performed on the television white space databases in 2016 at the urging of the National Association of Broadcasters.<sup>26</sup>

#### IV. Conclusion

The Commission should grant the *Petition* and issue a Notice of Proposed Rulemaking with the goals of: (i) ending overinclusive licensing practices by FSS operators; (ii) modernizing the Part 101 rules to allow more intensive terrestrial fixed service use of the 3.7-4.2 GHz band; and (iii) adopting other reforms to allow more intensive use of the 3.7-4.2 GHz band on a non-interfering basis.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "JCBurchett", written over a horizontal line.

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<sup>26</sup> See *In the Matter of Amendment of Part 15 of the Commission's Rules for Unlicensed White Space Devices*, Notice of Proposed Rulemaking and Order, 31 FCC Rcd. 1657, ¶¶ 13-14 (2016).

**CERTIFICATE OF SERVICE**

The undersigned hereby certifies that the foregoing document was served this date upon the following:

Andrew Kreig  
Co-Chair, Fixed Wireless Communications Coalition, Inc.  
701 Pennsylvania Ave. NW, PH 8  
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(via first class U.S. mail, postage prepaid)

A handwritten signature in black ink, appearing to read "Caitlin Mori", written over a horizontal line.

Caitlin Mori  
January 9, 2017